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Catch rate data from logbooks for the less-than-35ft sector

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[1] This series documents the scientific basis for the evaluation of fisheries resources in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

[1] La présente série documente les bases scientifiques des évaluations des ressources halieutiques du Canada. Elle traite des problèmes courants selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

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Abstract

Catch and effort data recorded in logbooks maintained by participants in both the index fishery in 1998 and the commercial fishery in 1999 were examined. Some data from 1997, mostly from sentinel fishermen, is also included. The mean and median catch rates were computed by year, month and location. For the study of location both unit area and the finer spatial scale of statistical section were examined. The spatial patterns were similar in the two years, with catch rates very low north of White Bay, increasing from White Bay to eastern Notre Dame Bay, generally highest from northern Bonavista Bay to western Trinity Bay, lower from eastern Trinity Bay to the eastern Avalon Peninsula and increasing again on the southern Avalon Peninsula. No inferences about annual trends could be drawn from just two years of data, especially since the dates of the fishing varied between the two years.

Résumé

Les données de captures et d'effort de pêche consignées dans des registres de bord par les participants à la pêche indicatrice de 1998 et à la pêche commerciale de 1999 ont été examinées. Certaines données de 1997, provenant surtout de pêcheurs sentinelles, ont également été incluses. Les taux de capture moyens et médians ont été calculés par année, par mois et par lieu. Pour l'étude des lieux de pêche, la zone-unité et l'unité statistique, à plus petite échelle spatiale, ont toutes les deux été examinées. La répartition spatiale était semblable dans les deux années de l'étude : les taux de capture étaient très faibles au nord de White Bay, ils augmentaient de White Bay à la partie est de la baie Notre-Dame, ils étaient généralement les plus élevés dans la région allant du nord de Bonavista Bay à la partie ouest de Trinity Bay, ils étaient plus bas dans la région allant de la partie est de Trinity Bay à la côte est de Avalon Peninsula et augmentaient sur la côte sud de Avalon Peninsula. Aucune conclusion sur les tendances annuelles n'a pu être tirée de seulement deux ans de données, d'autant plus que les dates de pêche différaient entre les deux années.

Introduction

Logbooks were not required for vessels less than 35 ft prior to the moratorium and catch information was inferred from purchase slips and other sources. No measure of fishing effort is available for the less than 35 ft vessels for the pre-moratorium period. Vessels greater than 35 ft were required to complete logbooks prior to moratorium. These historic data have been examined by Murphy and Shelton (1997) and found to be extremely sparse and unreliable.

A new science logbook (Murphy Logbook) was introduced as a condition of license for vessels less than 35ft for the commercial "index" fishery in 1998. Catch rates have been derived from information on cod directed sets recorded by fishermen for both the 1998 index fishery (about 5,000 t) and the 1999 commercial fishery (about 9,000 t). Data are examined for spatial and temporal pattern with a view to developing a statistical model to derive indices of stock size. Some data from 1997, mostly from sentinel fishermen, is also included is some of the plots for comparison but is not given any further consideration in this research document.

Methods

A sample is considered to be the catch rate for each "set" in a specified unit area, month and year. Catch is expressed in kilograms. Gillnet effort was standardized to net per set and linetrawl effort was standardized to 1,000 hooks per set.

Arithmetic means were considered as a possible statistic for making comparisons; however, the distributions of sample values within area/month/year cells tend to be skewed with long tails representing a small number of high catch rates. Therefore emphasis is placed on the median as an indicator of central tendency in the comparisons below.

Two spatial scales are considered, the unit areas (Fig. 1, 3Kd etc.) and the statistical sections (Fig. 2, 2-28).

Result and discussion

The spatial pattern in the two years (1998 and 1999) was very similar with catch rates very low north of White Bay, increasing from White Bay to eastern Notre Dame Bay, generally highest from northern Bonavista Bay to western Trinity Bay, lower from eastern Trinity Bay to the eastern Avalon Peninsula, and increasing again on the southern Avalon Peninsula.

For gillnets (all areas combined), there appears to be an overall downward trend whereas for linetrawls (all areas combined), there is no clear trend. By area, gillnet catch rates show an increasing trend in Trinity Bay and a decreasing trend along the Southern Shore. For linetrawls by area there are no clear trends. There appears to be increased seasonal pattern

in the catch rates for gillnets towards the south. Linetrawl catch rates show less seasonality but possibly some evidence of within-year declines.

It is clear that in order to develop an index of stock size from these data, one of the considerations will be removal of small scale temporal and spatial patterns to reveal underlying stock size signals. It is possible that the scale of month by unit area or statistical section used in this analysis may not be fine enough.

References

Murphy, E.F. and P.A. Shelton. 1997. Commercial catch rate data as an index of cod abundance in NAFO Divisions 2J3KL. NAFO SCR Doc. 97/46, 37p.

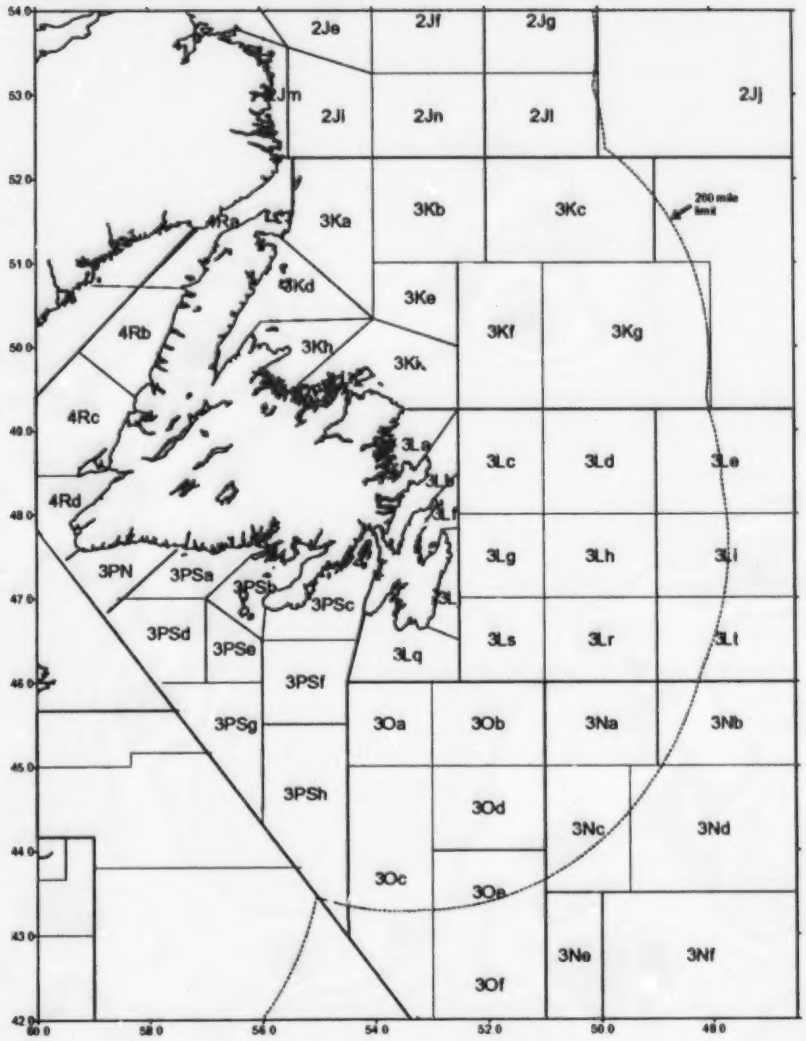

Fig 1. NAFO unit areas used in the analysis of logbook data.

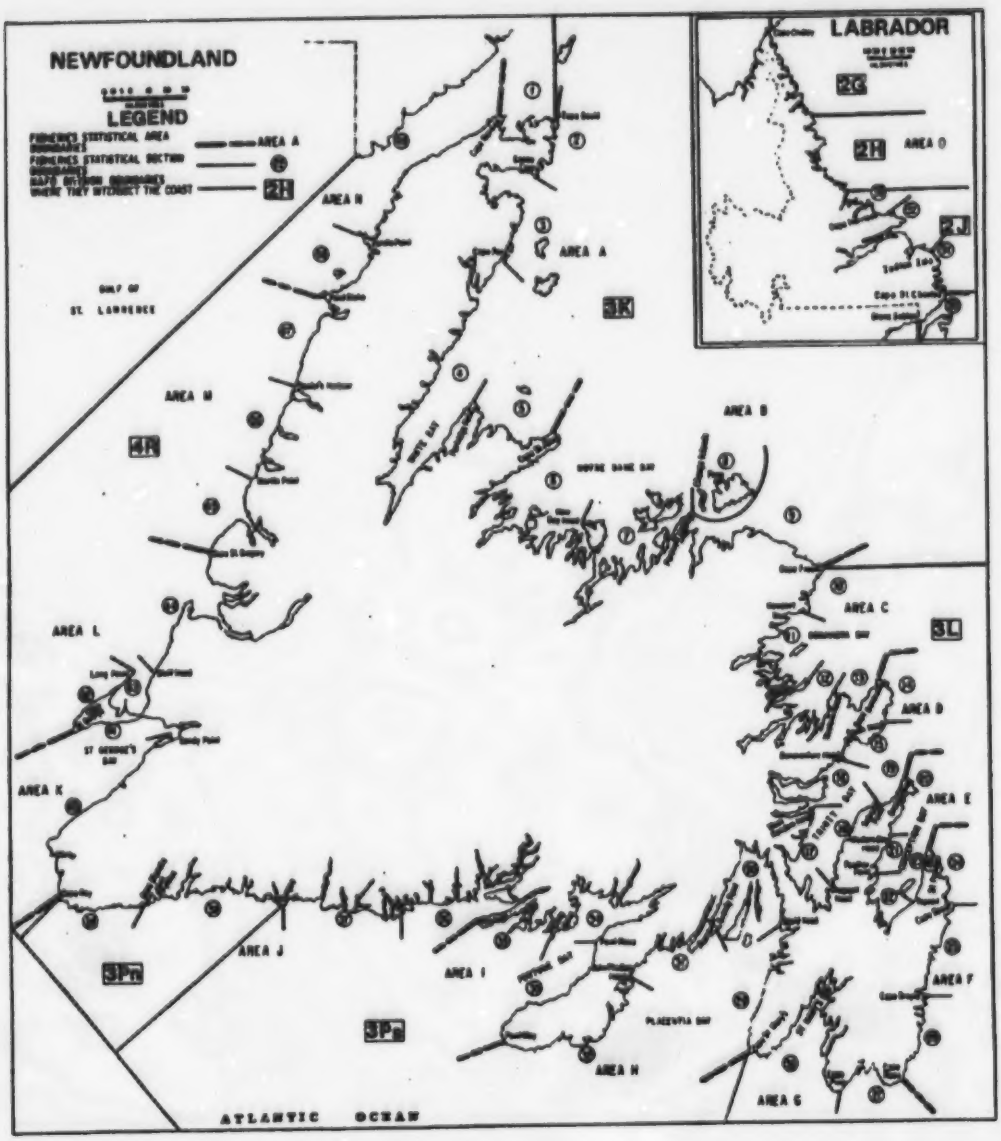

Fig. 2. Statistical sections used in the analysis of logbook data.

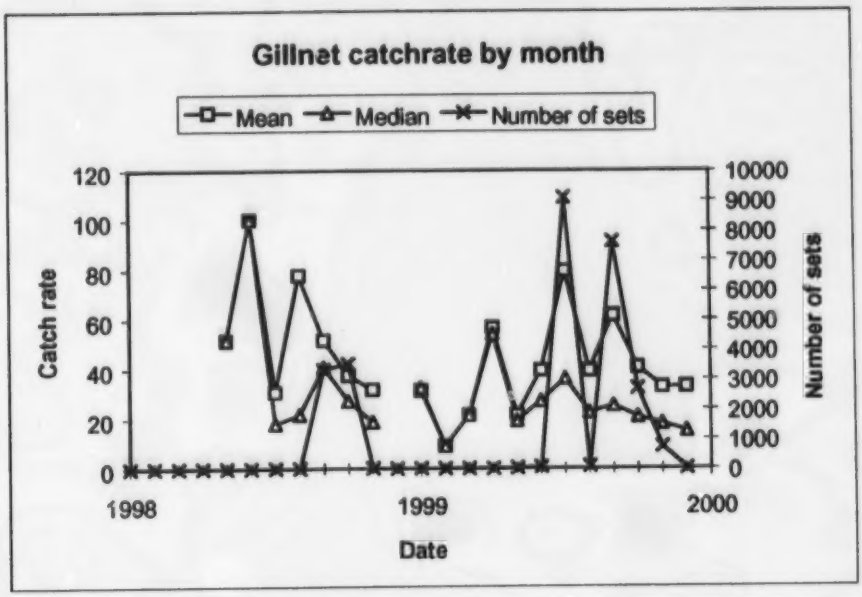

Fig. 3. Monthly gillnet effort, mean and median catch rates for 2J3KL combined.

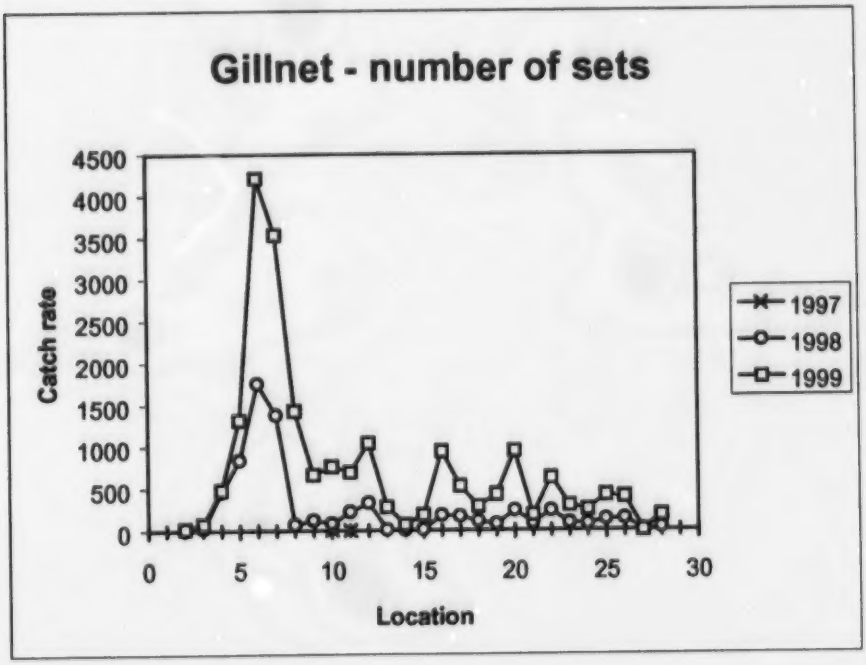

Fig. 4. Number of gillnet sets by statistical section for 1997-1999.

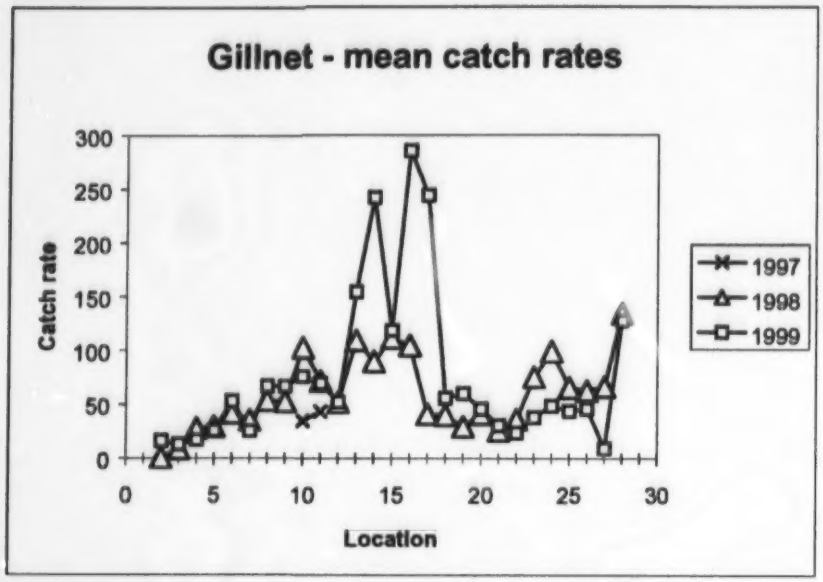

Fig. 5. Mean gillnet catchrates for 1997-1999 by statistical location.

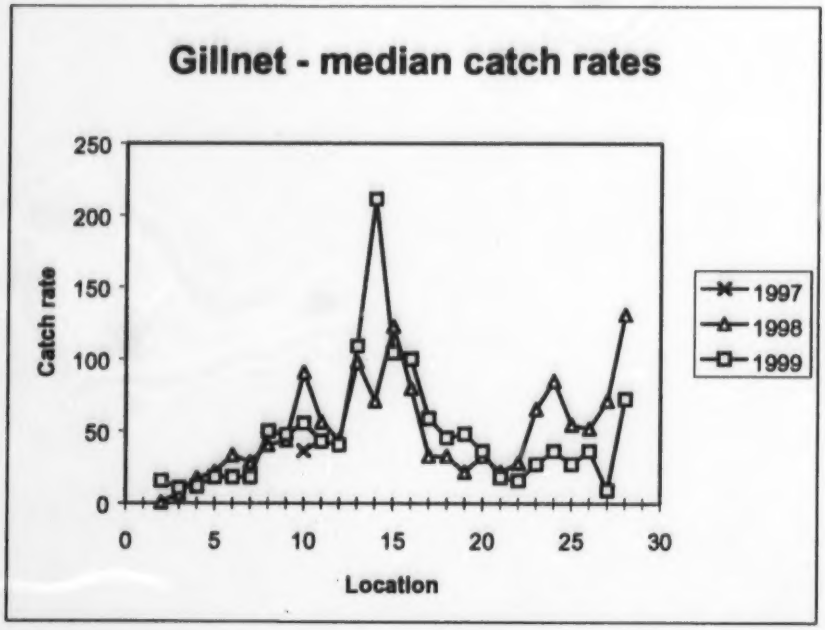

Fig. 6. Median gillnet catchrates for 1997-1999 by statistical location.

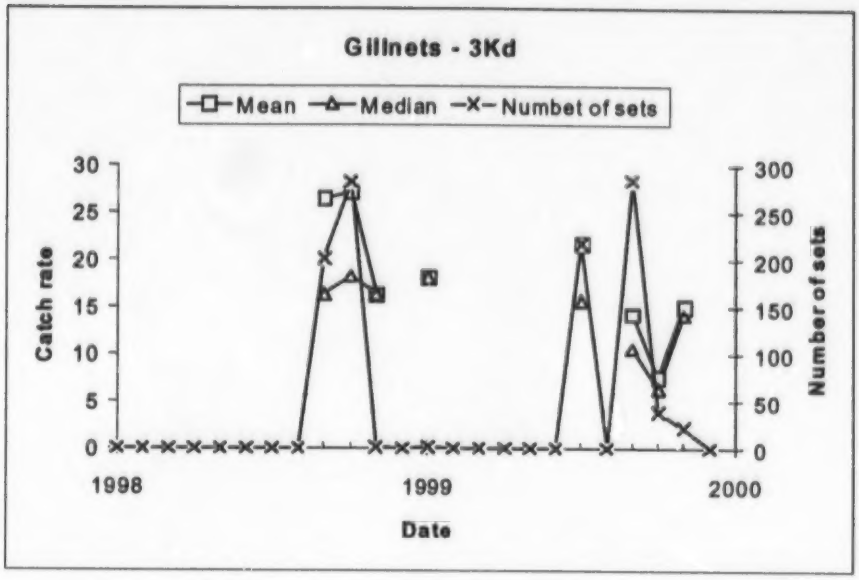

Fig. 7. Mean, median and set number for gillnet catch rates in unit area 3Kd in 1998 and 1999.

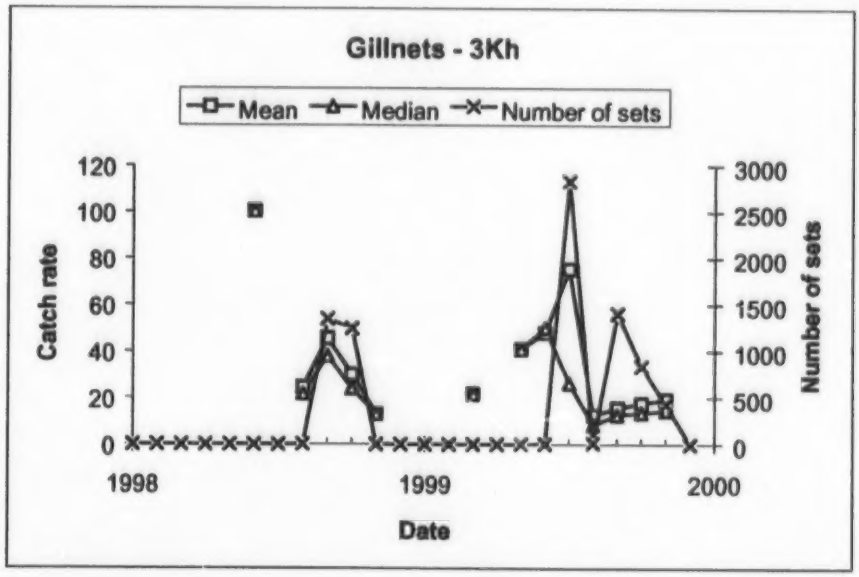

Fig. 8. Mean, median and set number for gillnet catch rates in unit area 3Kh in 1998 and 1999.

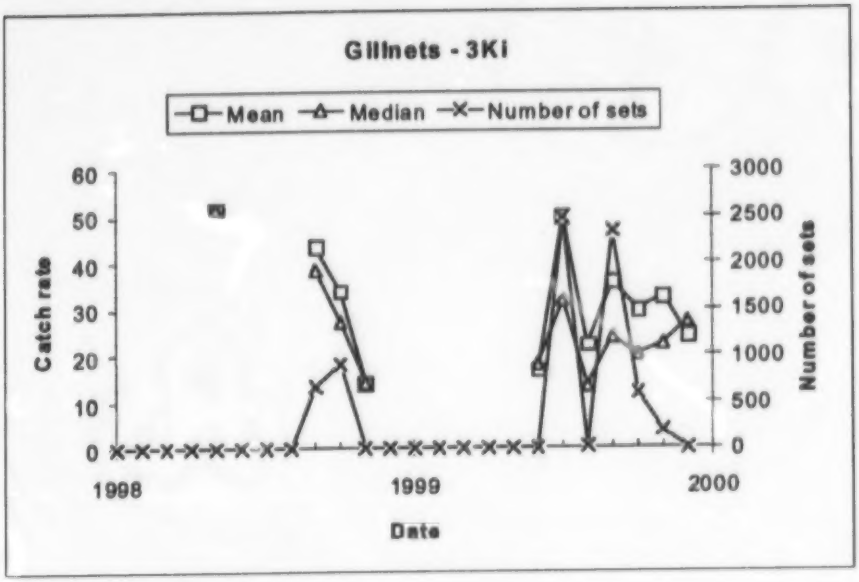

Fig. 9. Mean, median and set number for gillnet catch rates in unit area 3Ki in 1998 and 1999.

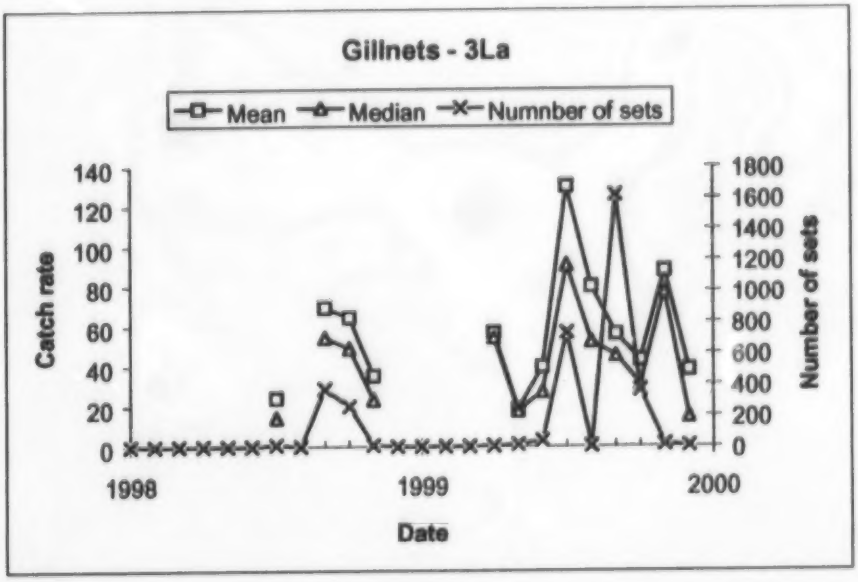

Fig. 10. Mean, median and set number for gillnet catch rates in unit area 3La in 1998 and 1999.

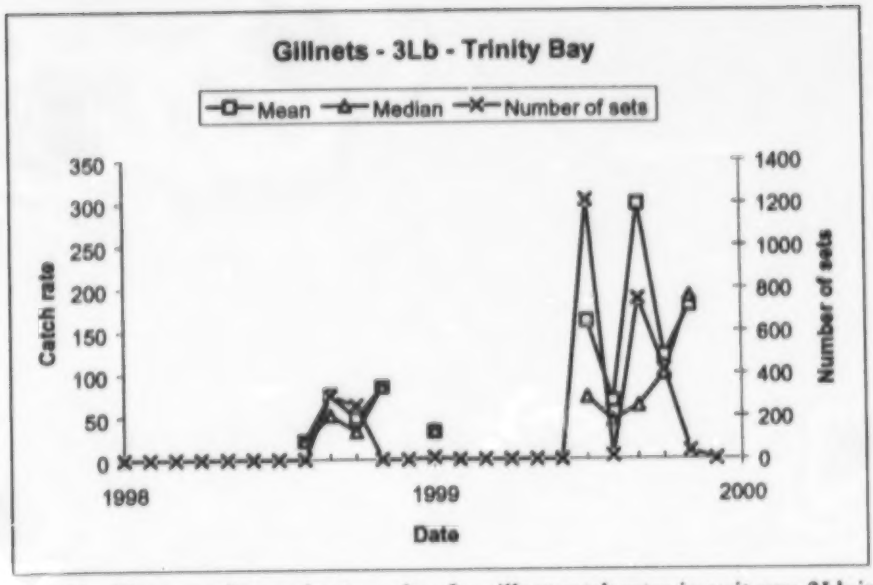

Fig. 11. Mean, median and set number for gillnet catch rates in unit area 3Lb in 1998 and 1999.

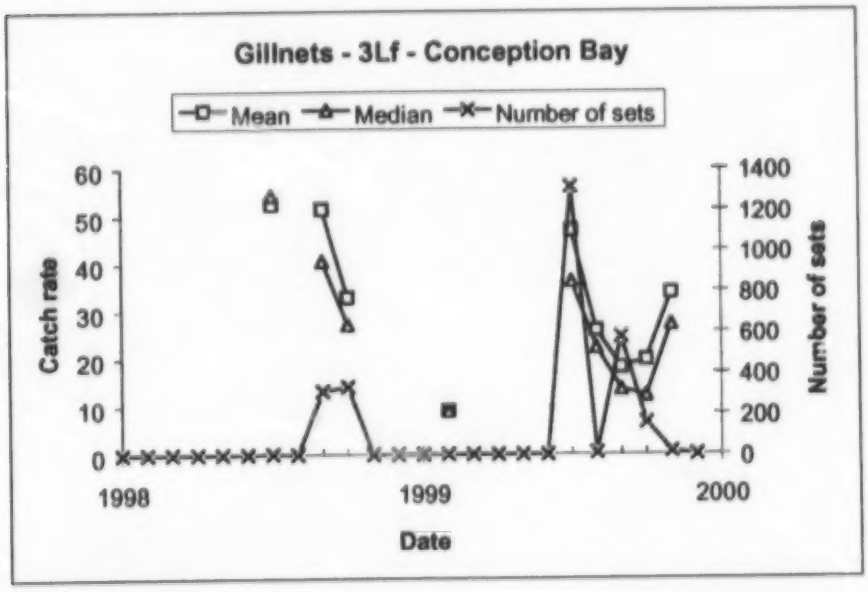

Fig. 12. Mean, median and set number for gillnet catch rates in unit area 3Lf in 1998 and 1999.

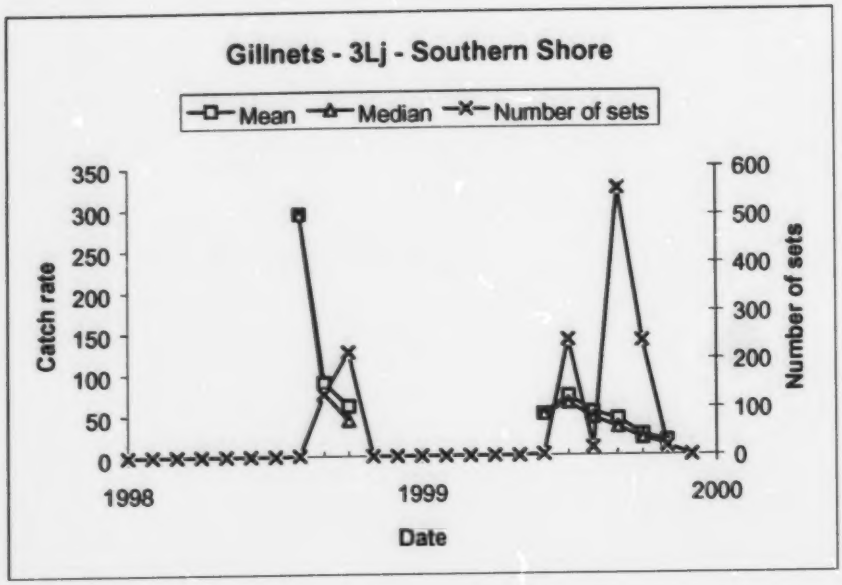

Fig. 13. Mean, median and set number for gillnet catch rates in unit area 3Lj in 1998 and 1999.

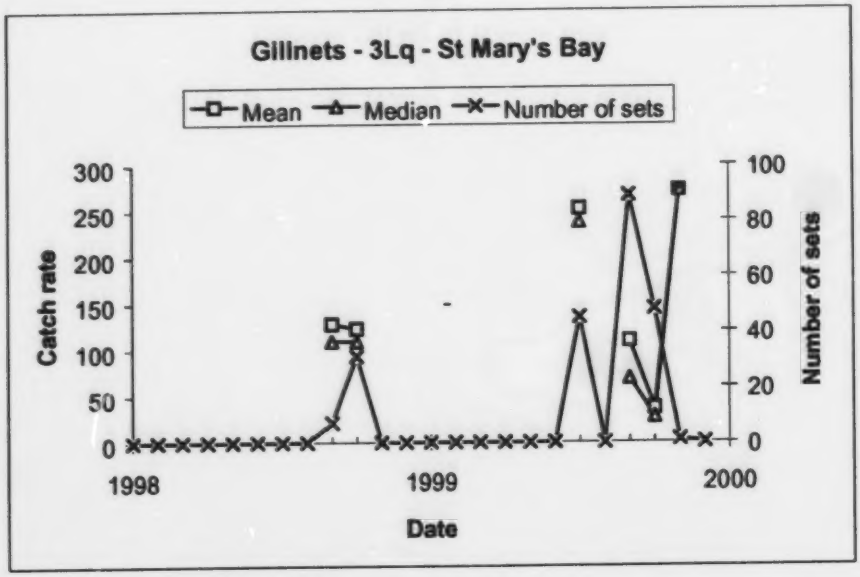

Fig. 14. Mean, median and set number for gillnet catch rates in unit area 3Lq in 1998 and 1999.

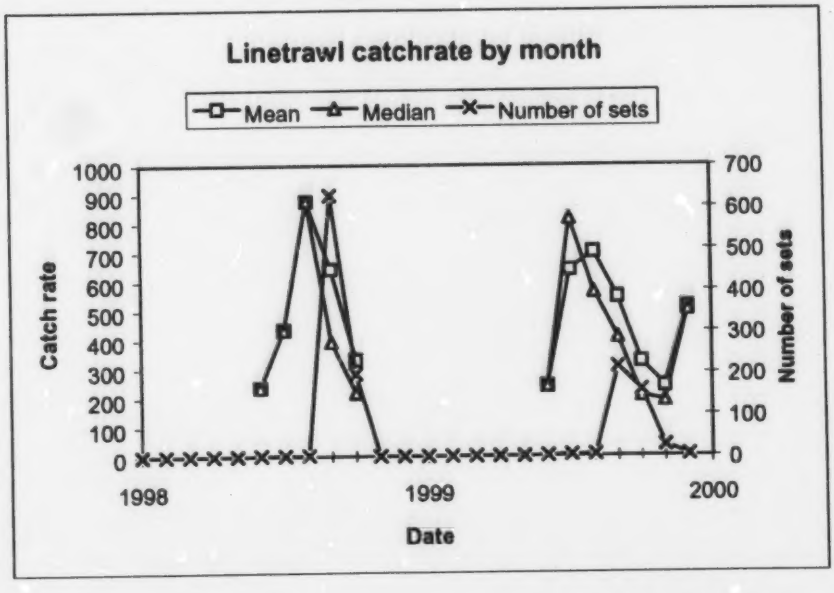

Fig. 15. Monthly linetrawl effort, mean and median catch rates for 2J3KL combined.

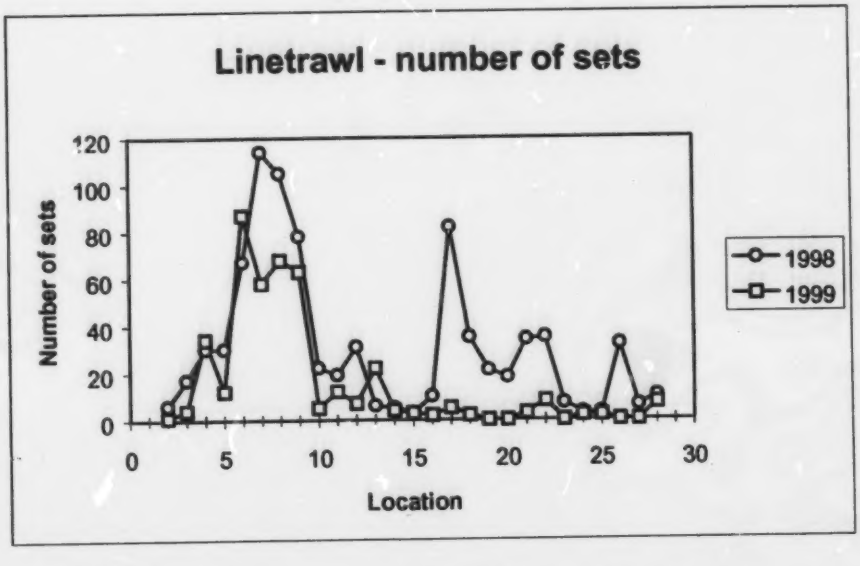

Fig. 16. Number of linetrawl sets by statistical section for 1998-1999.

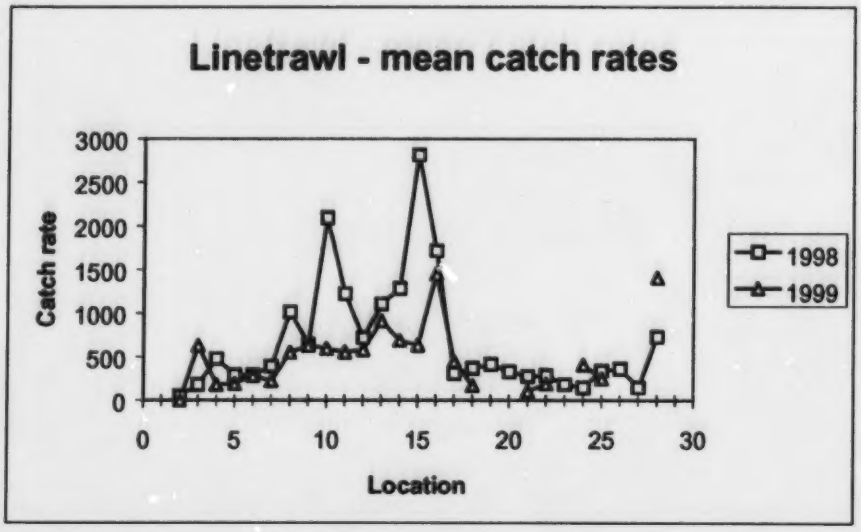

Fig. 17. Mean linetrawl catchrates for 1998-1999 by statistical location.

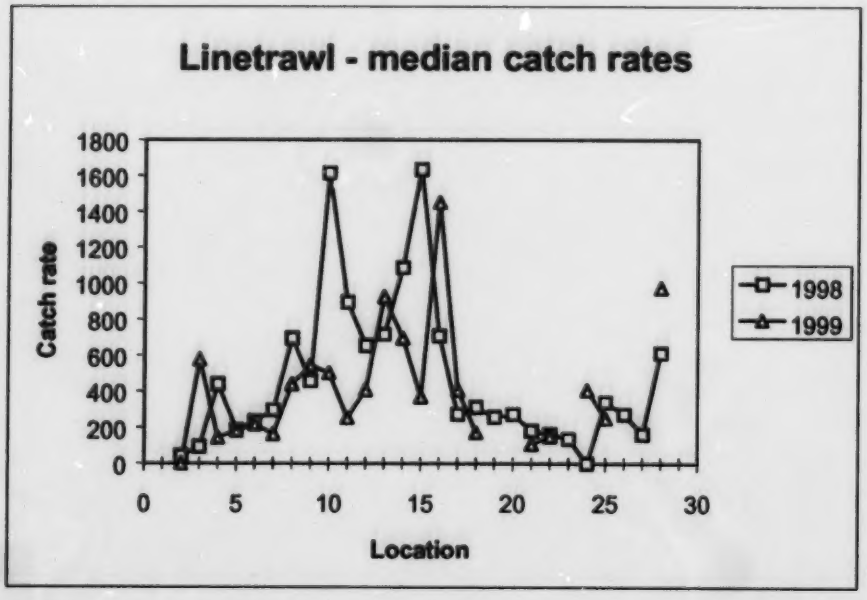

Fig. 18. Median linetrawl catchrates for 1998-1999 by statistical location.

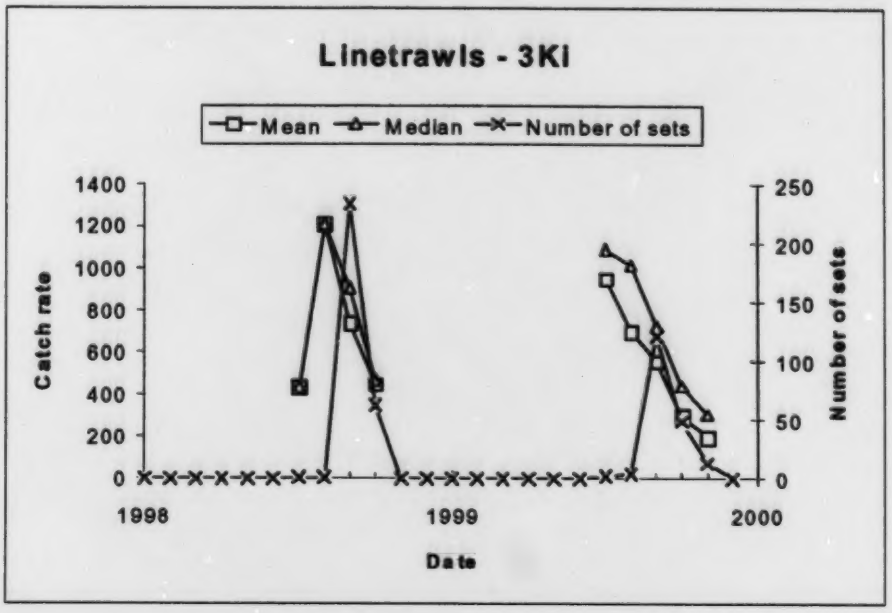

Fig. 19. Mean, median and set number for linetrawl catch rates in unit area 3Ki in 1998 and 1999.

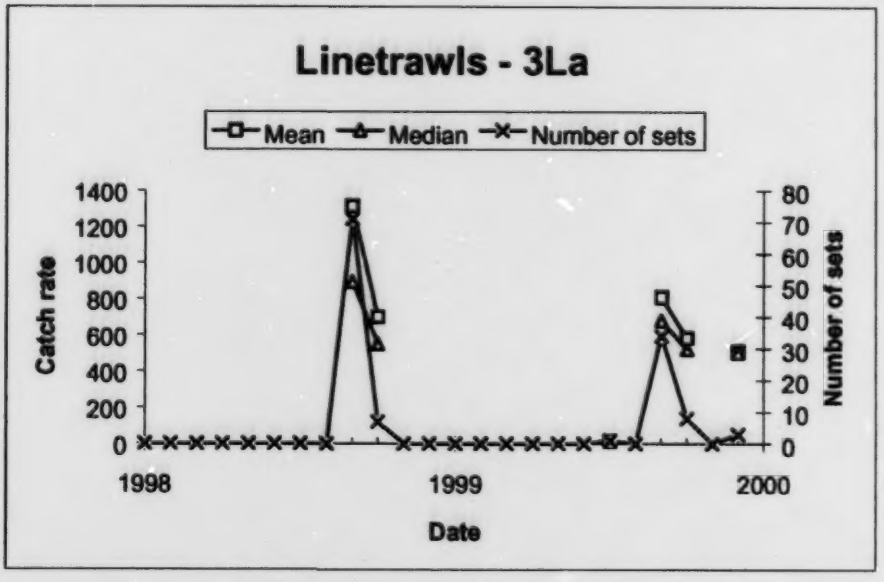

Fig. 20. Mean, median and set number for linetrawl catch rates in unit area 3La in 1998 and 1999.

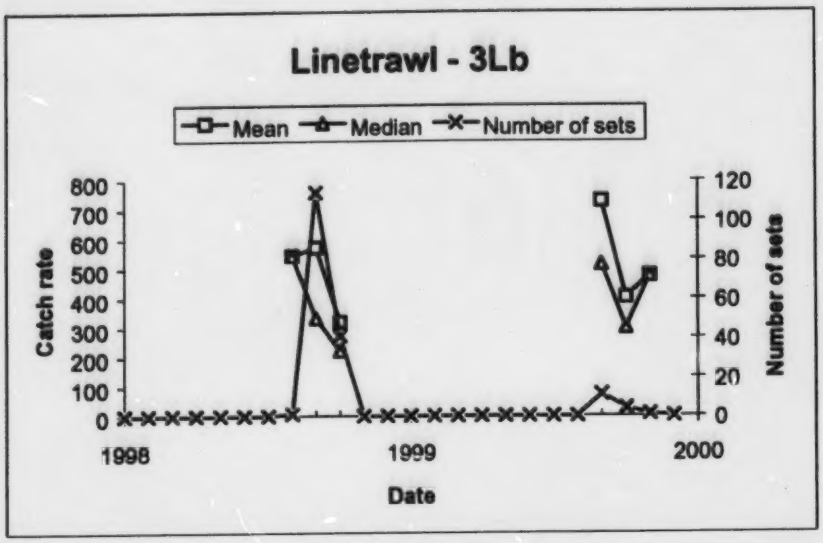

Fig. 21. Mean, median and set number for linetrawl catch rates in unit area 3Lb in 1998 and 1999.

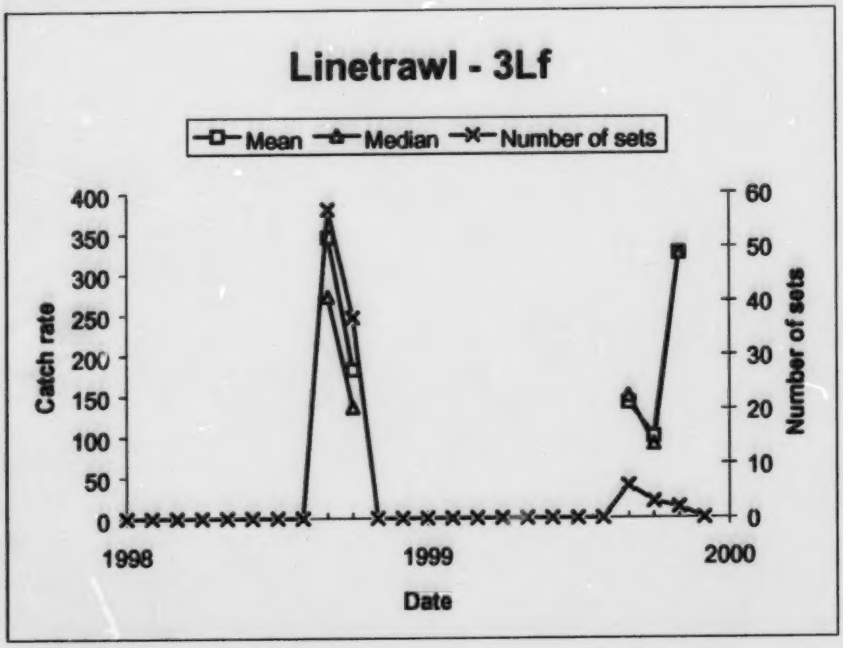

Fig. 22. Mean, median and set number for linetrawl catch rates in unit area 3Lf in 1998 and 1999.